



ICAO ENGINE nvPM EMISSIONS DATA SHEET

SUBSONIC ENGINES

ENGINE IDENTIFICATION: PW1923G-A BYPASS RATIO (-): 11.2
 UNIQUE ID NUMBER: 04F20PW203 PRESSURE RATIO π_{co} (-): 37.7
 COMBUSTOR: TALON X, Block-C
 ENGINE TYPE: TF RATED OUTPUT F_{oo} (kN): 105.9

REGULATORY DATA

CHARACTERISTIC VALUES:	LTO_{mass}/F_{oo} (mg/kN)	LTO_{num}/F_{oo} (particles/kN)	NVPM MASS CONCENTRATION ($\mu\text{g}/\text{m}^3$)
LTO/ F_{oo} AND MAX nvPM _{mass}	14.2	4.08E+14	403
AS % OF CAEP/10 LIMIT	-	-	6.3
AS % OF CAEP/11 LIMIT (InP)	0.6	2.8	
AS % OF CAEP/11 LIMIT (NT)	2.7	6.4	

MEASURED DATA

MODE	POWER SETTING (% F_{oo})	TIME minutes	FUEL FLOW kg/s	EMISSIONS INDICES*		NVPM MASS CONCENTRATION PEAK nvPM _{mass} ($\mu\text{g}/\text{m}^3$)
				EI _{mass} (mg/kg)	EI _{num} (particles/kg)	
TAKE-OFF	100	0.7	0.765	12.4	1.94E+14	
CLIMB OUT	85	2.2	0.631	7.3	1.87E+14	
APPROACH	30	4.0	0.222	0.2	1.40E+13	
IDLE	7	26.0	0.075	0.6	7.33E+13	
LTO TOTAL (kg, mg, number of particles)			285	1084	3.11E+16	-
NUMBER OF ENGINES				1	1	1
NUMBER OF TESTS				3	3	3
AVERAGE LTO/ F_{oo} VALUES (mg/kN, particles/kN)				10.2	2.93E+14	-
MAX EI VALUES (mg/kg, particles/kg) AND MAX MASS CONC. ($\mu\text{g}/\text{m}^3$)				12.4	2.02E+14	313

* Emissions Indices are corrected for thermophoretic loss and fuel hydrogen content

DATA FOR EMISSIONS INVENTORIES (ESTIMATIONS FOR ENGINE EXIT PLANE VALUES)

MODE	POWER SETTING (% F_{oo})	CORRECTED EMISSIONS INDICES	
		EI _{mass_SL} (mg/kg)	EI _{num_SL} (particles/kg)
TAKE-OFF	100	15.6	7.45E+14
CLIMB OUT	85	10.0	9.18E+14
APPROACH	30	0.3	6.07E+13
IDLE	7	1.1	6.37E+14

AMBIENT CONDITIONS

	From	To	FUEL	
			HEAT OF COMBUSTION (MJ/kg)	
BAROMETER (kPa)	102.0	103.3	43.21	13.98
TEMPERATURE (K)	272.0	278.1	HYDROGEN CONTENT (%mass)	18.1
HUMIDITY (kg water/kg dry air)	0.0012	0.0022	AROMATICS CONTENT (%vol)	0.78
			NAPHTHALENE CONTENT (%vol)	553
			SULPHUR CONTENT (ppm by mass)	

MANUFACTURER: Pratt & Whitney
 TEST ORGANIZATION: Pratt & Whitney
 TEST LOCATION: Mirabel Aerospace Centre - Quebec
 TEST DATES: 25/03/2018-26/03/2018

REMARKS

1. Data from certification report PWA-12249
2. Block C combustor
3. nvPM levels in accordance with Annex 16 Vol. II, Chapter 4, Appendix 7 and Appendix 8.
4. Data revised: nvPM EI_{mass_SL} corrected